Tennessee State Board of Education **Agenda**
May 2, 2003 **Action Item IV.K.**

Licensure Standards, Technology—Engineering Education, Rules

The Background:

Licensure standards for teachers of technology-engineering education currently require a four-year program of study (or a one-year post baccalaureate program) offered by an institution of higher education with an approved program of study. Currently, only one university offers the program, and the program will likely be phased out in a couple of years. Thus, the state needs to consider development of other ways to license technology education teachers. The state also needs to revise the technology-engineering education licensure standards to be aligned more closely with the Tennessee curriculum standards.

Board staff presented a status report to the Board on January 31 including proposals to (a) provide alternative licensure for candidates seeking initial endorsements; (b) provide streamlined routes for candidates who are already licensed teachers to attain an additional endorsement in technology-engineering education; and (c) provide for trade and industry teachers who have bachelor's degrees the opportunity to attain a regular license endorsed in technology-engineering education.

The Advisory Council on Teacher Education and Certification subsequently approved the proposals and the attached licensure standards. The licensure standards become effective no later than September 1, 2005.

The Recommendation:

The Advisory Council on Teacher Education and Certification recommends approval of the proposed licensure standards and the accompanying rules. The State Board of Education staff concurs with this recommendation.

Tennessee Teacher Licensure Standards:
Technology-Engineering Education
(Endorsement in Technology-Engineering Education 5-12)

Technology has been a powerful force in the development of civilization. Human action has used technology to shape the world in many ways according to interests or needs of the time. Many parts of our world are designed--shaped and controlled largely through the use of technology. An understanding of the interaction among humans, technological processes, and the world has an impact on further technological innovation. This context for viewing technological development is sometimes referred to as the "designed world."

Technology-engineering education develops student learning of processes and knowledge related to technology that are needed to solve problems and extend human capabilities. Technology-engineering education is an applied discipline to promote technological literacy at all levels. Professional studies and experiences culminating in technology education licensure will enable the teacher candidate to meet the following standards:

Standard 1

The Nature of Technology. Candidates demonstrate an understanding of technology, its role in human design in the world, and its relationship to the systems approach within technology education.

Supporting Explanation

Candidates explain the characteristics and scope of technology. They compare the relationship among technologies and systems and the connections between technology and other disciplines. They apply the concepts and principles of technology and systems when teaching technology in the classroom and laboratory. Candidates understand positive and negative aspects of technology in our world.

Standard 2

Technology and Society. Candidates demonstrate an understanding of technology and society within the context of human design in the world.

Supporting Explanation

Candidates compare the relationships between technology and social, cultural, political, and economic systems. They assess the role of society in the development and use of technology, and they assess the importance of significant technological innovations on the history of humankind. Candidates judge the effects of technology on the environment. They evaluate the relationship between technology and social institutions, such as family, education, government, and workforce. Candidates understand appropriate and inappropriate uses of technology and make decisions based on knowledge of intended an unintended effects of technology on society and

the environment. The candidates demonstrate these capabilities within the context of physical systems; medical and agricultural biotechnologies; communication, transportation; construction; and manufacturing.

Standard 3

Design. Candidates demonstrate an understanding of design within the context of the human design of the world.

Supporting Explanation

Candidates explain the importance of design in the human made world. They describe the attributes of design and analyze the engineering design process and principles. Candidates apply the processes of troubleshooting, research and development, invention, innovation, and experimentation in developing solutions to a design problem. They investigate the relationship between designing a product and the impact of the product on the environment, the economy, and the society.

Standard 4

Technological Operations and Processes. Candidates demonstrate proficiency in technological operations and processes within the context of the designed world.

Supporting Explanation

Candidates select design problems and include appropriate criteria and constraints for each problem. They evaluate a design, assessing the success of a design solution and develop proposals for design improvements. They analyze a designed product and identify the key components of how it works and how it was made, and they operate and maintain technological products and systems. Candidates develop and model a design solution and complete an assessment to evaluate the merits of the design solution. They operate a technological device and/or system. They diagnose a malfunctioning system, restore the system, and maintain the system. They investigate the impacts of products and systems on individuals, the environment, and society. Candidates assess the impacts of products and systems. They follow safe practices and procedures in the use of tools and equipment. The candidates judge the relative strengths and weaknesses of a designed product from a consumer perspective. They exhibit respect by properly applying tools and equipment to the processes for which they were designed. They design and use instructional activities that emphasize solving real open-ended problems. The candidates demonstrate these capabilities within the context of physical systems; medical and agricultural biotechnologies; communication, transportation; construction; and manufacturing.

Standard 5

Designed World Analysis and Improvement. Using systems analysis, candidates evaluate the designed world to determine the success of a technological intervention and use this analysis to improve technology in a variety of contexts.

Supporting Explanation

Candidates analyze the principles, contexts, and applications of physical systems; medical and agricultural biotechnologies; communication, transportation; construction; and manufacturing. They select and use appropriate technologies in a variety of contexts, analyze the effects of the intervention, and use the analysis as a source of technological innovation in the designed world.

Standard 6

Curriculum. Candidates design, implement, and evaluate curricula based upon standards for technological literacy.

Supporting Explanation

Candidates identify appropriate content for the study of technology at different grade levels. They design a technology curriculum that integrates technological content from other fields of study. They identify curriculum and instructional materials and resources that enable effective delivery when teaching about technology. Candidates undertake long-term planning that results in an articulated curriculum based on state and national standards (or equivalent) for grades K-12. They use multiple sources of information to make informed decisions in technology curriculum, and they incorporate up-to-date technological developments into the curriculum. Candidates implement a technology curriculum that systematically expands the technological capabilities of the student.

Standard 7

Instructional Strategies. Candidates use a variety of effective teaching practices that enhance and extend learning of technology.

Supporting Explanation

Candidates base instruction on contemporary teaching strategies that are consistent with state and national standards. They apply principles of learning and consideration of student differences to the delivery of instruction. Candidates select and use a variety of instructional strategies, using appropriate materials, tools, and processes to maximize student learning about technology. They select and use a variety of student assessments appropriate for different instructional materials. Candidates evaluate instructional strategies to improve teaching and learning in the technology classroom by using student learning outcomes, reflection, and other techniques. They exhibit an enthusiasm for teaching technology by creating meaningful and challenging technology learning experiences that lead to positive student attitudes toward the study of technology.

Standard 8

Learning Environment. Candidates design, create, and manage learning environments that promote technological literacy.

Supporting Explanation

Candidates create a rich learning environment that provides for varied educational experiences in the technology classroom and laboratory. They identify a learning environment that encourages, motivates, and supports student learning, innovation, design, and risk-taking. They design a learning environment that establishes student behavioral expectations that support an effective teaching and learning environment. They create a flexible learning environment that is adaptable for the future. Candidates exhibit safe technology laboratory practice by designing, managing, and maintaining a physically safe technology-learning environment.

Standard 9

Students. Candidates understand differences among students and how they learn.

Supporting Explanation

Candidates design technology experiences for students of different ethnic and socioeconomic backgrounds, gender, age, interest, and exceptionalities. They identify how students learn technology most effectively by integrating current research about hands-on learning and learning about the content of technology. Candidates create productive technology experiences for students with different abilities, interests, and ages.

Standard 10

Professional Growth. Candidates understand and value the importance of engaging in comprehensive and sustained professional growth to improve the teaching of technology.

Supporting Explanation

Candidates demonstrate a continuously updated and informed background about the knowledge base and processes of technology. They continuously build upon effective instructional practices that promote technological literacy. They collaborate with other candidates and professional colleagues to promote professional growth, become actively involved in professional organizations, and attend professional development activities. Candidates demonstrate a value for continuous professional growth and reflect upon how technology teachers can improve their teaching practice. They demonstrate the importance of professionalism by promoting technology organizations for students in the technology classroom, and they apply various marketing principles and concepts to promote technology education and the study of technology.

Program Implementation Standards

1. Programs for the endorsement in technology-engineering education enable teacher candidates to meet performance standards in teaching technology-engineering education appropriate to grades five through twelve.

2. Candidates for licensure and endorsement in technology-engineering education may qualify through several different routes:

   a. Candidates seeking initial licensure and endorsement: Candidates may seek licensure and endorsement by completing a traditional program, consistent with these licensure standards as approved by the Department of Education.

   b. Candidates seeking alternative licensure and endorsement: Candidates who hold a bachelor's degree and have expertise in the technology education area but who are not licensed teachers may use alternative A, C and E licenses. The Division of Vocational-Technical Education, working with teacher preparation programs, will verify subject area competence of individual candidates seeking licensure. Initially, it is assumed that candidates will use the Alternative E License, which allows them to begin teaching if they successfully complete the Praxis specialty exam. Eventually, it is assumed that candidates will use the Alternative C License, offered on campuses or online.

   c. Candidates seeking additional endorsement: Candidates who are licensed teachers who have taught technology education for at least two years prior to or including 2002-03 (or who have expertise in the technology education area as verified by the Division of Vocational-Technical Education) may add the endorsement provided they: (1) complete a 5-day training in technology-engineering offered by the Department of Education (or equivalent methods course); (2) complete a one-day training in safety; (3) pass the Praxis examination; and (4) are recommended by the Division of Vocational-Technical Education.

   d. Trade and industry teachers: Candidates who hold a bachelor's degree and a professional occupational education license may be issued a professional license endorsed in technology education provided they: (1) complete the requirements in 2. C. and (2) pass the Praxis examination in Principles of Learning and Teaching.

3. Institutions use the following documents (as they may be amended) and other sources of information when planning, implementing and evaluating the technology-engineering programs: Model Standards for Beginning Teacher Licensing: A Resource for State Dialogue, developed by the Interstate New Teacher Assessment and Support Consortium (1992); Standards for Technological Literacy: Content for the Study of Technology, International Technology Education Association (ITEA)(2000), Curriculum Standards for Initial Programs in Technology Education, ITEA and Council on Technology Teacher Education (2003) and Tennessee Technology Education Curriculum Standards (1999).

4. These licensure standards become effective no later than September 1, 2005.

Teacher Education and Licensure
Effective Dates
Technology-Engineering Education

Rule 0520-2-3-.21 Effective Dates is amended by adding the following language as paragraph (17) so that as amended the rule shall read:

(17) Teacher candidates seeking licensure and endorsement in the following area shall meet the requirements of Rules 0520-2-3-.01(1) through (9) no later than September 1, 2005. This rule will supercede Rule 0520-2-3-.21(3) insofar as it applies to the area of endorsement listed below:

Technology-Engineering Education (Technology Education), 5-12

Paragraph (9) of Rule 0520-2-3-.01 Licensure, General Requirements is amended by deleting the paragraph in its entirety and substituting instead the following language so that as amended the paragraph shall read:

(9) Teacher candidates seeking to add endorsements to a teacher license shall complete a teacher education program for additional endorsement. Institutions which offer programs for additional endorsement shall submit to the State Department of Education a list of specialty areas in which additional endorsements are offered. Institutions of higher education will verify completion of the appropriate course requirements to the Department of Education. Teachers who are licensed in Tennessee and who complete programs of study for additional endorsements at institutions in other states may be recommended by the out-of-state institution to the State Department of Education for additional endorsements.